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(56) Documents Cited

GB 1370660 A	GB 1361501 A	GB 1325126 A
GB 0635949 A	US 5465851 A	US 5316156 A
US 5190211 A	US 5143431 A	US 4582003 A

(58) Field of Search

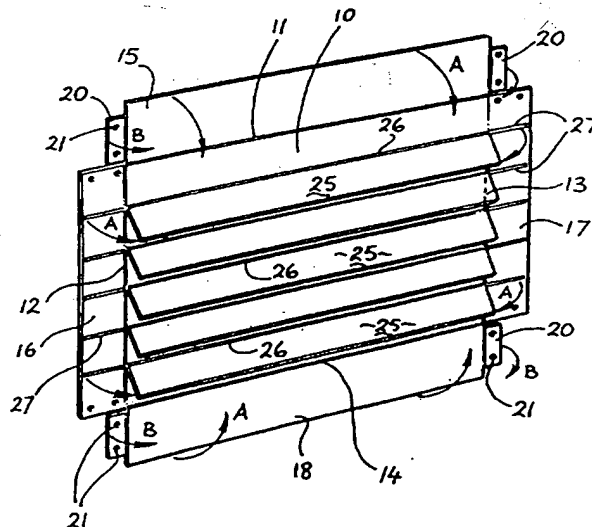
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(54) Abstract Title

Folding lightweight shelf unit

(57) Flat-pack folding shelving comprises a one-piece sheet plastics moulding including a rectangular backboard 10 having top, side and bottom panels 15-18 hinged to it along lines of reduced thickness. The top and bottom panels have tabs 21 which fold to lie adjacent the ends of the sides so that holes 20 in the tabs and sides align for insertion of fasteners. Shelves 25 are integral with the backboard and hinge along lines 26 of reduced thickness. The shelves are somewhat longer than the backboard and their ends engage in grooves 27 in the sides. In another embodiment (Figs 3,4) the backboard has elongate recesses (40) into which separate hingeable shelves are inserted, and the sides have upper and lower recesses (41) which receive the ends of the top and bottom panels and ledges (42) upon which the ends of the shelves rest. Grooves (50) in the top and bottom panels may receive sliding door panels.

Figure 1



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

Figure 1

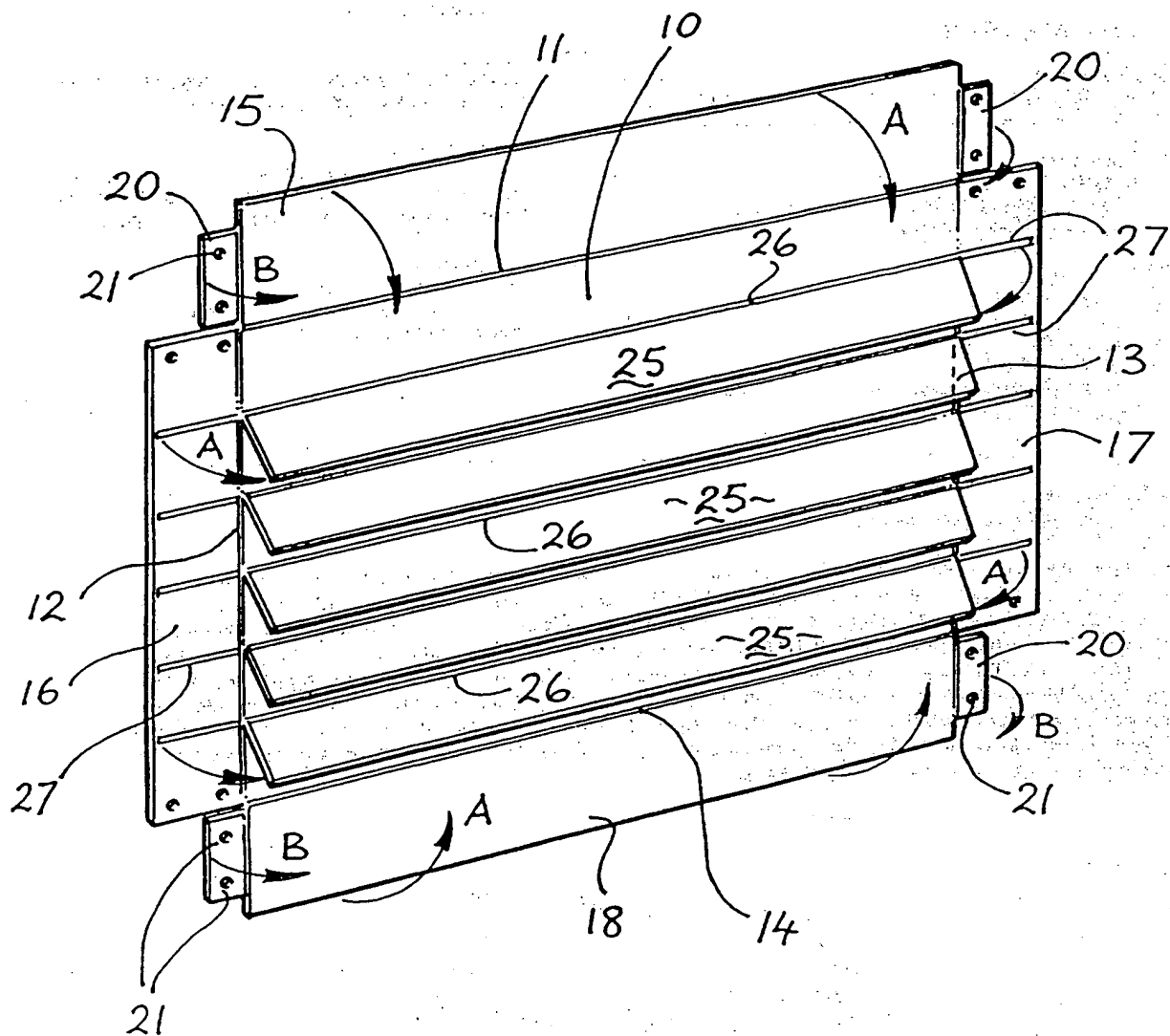


Figure 2

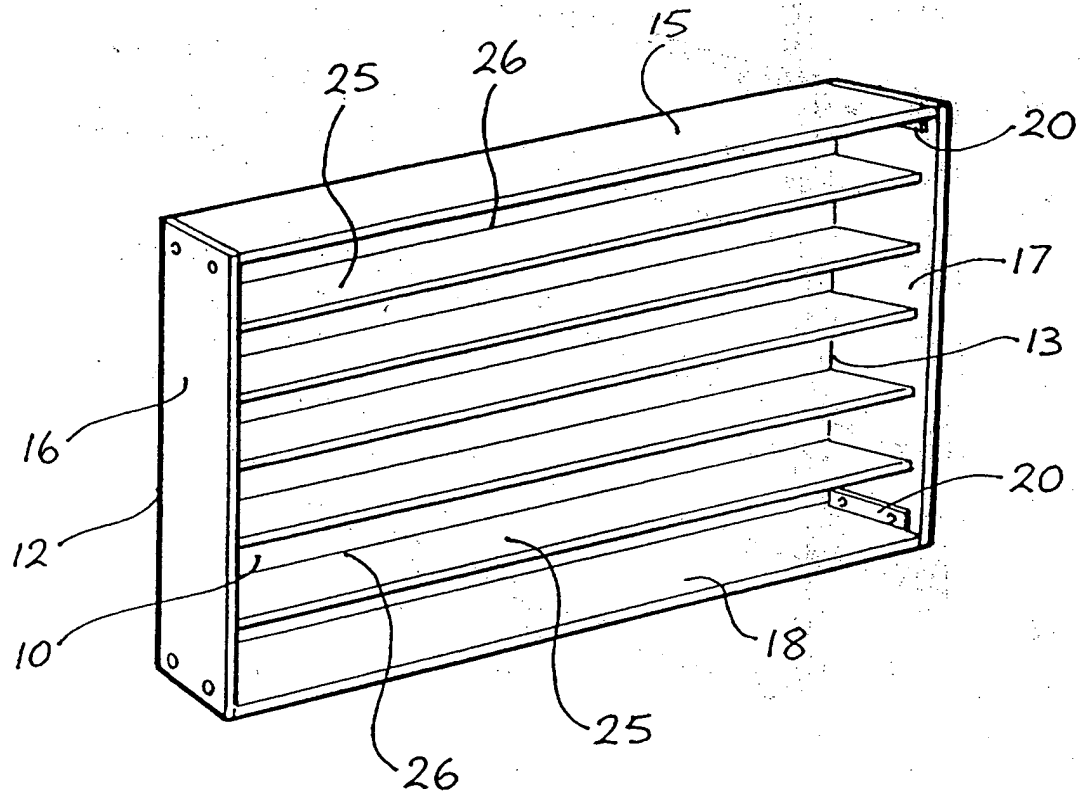
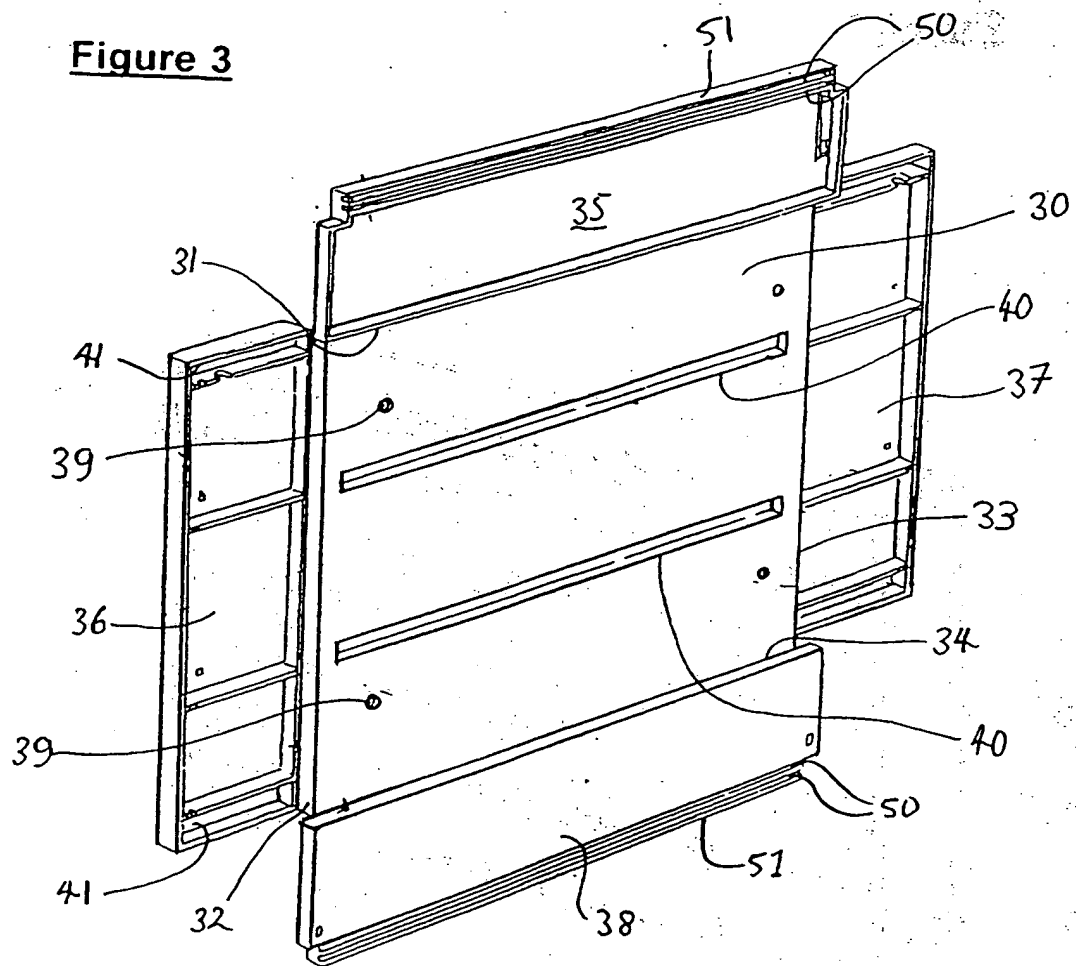
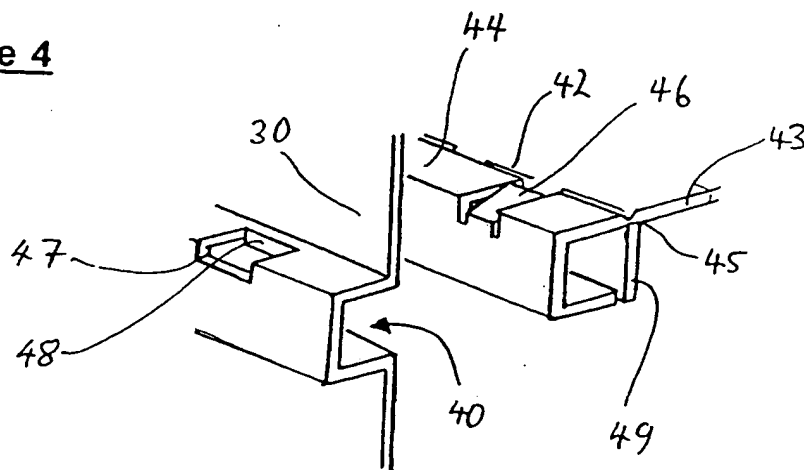


Figure 3**Figure 4**

A DISPLAY OR SHELF UNIT KIT

This invention relates to a display or shelf unit kit, suitable for making up into a display or shelf unit, as well as to a display or shelf unit constructed from such a kit.

5 Kits of parts, for making up into display or shelf units, are widely available in do-it-yourself outlets, hardware stores and so on. These mostly have pre-cut panels of suitable materials, such as pine, faced MDF or the like, and suitable fastenings to permit the components to be joined together to make a complete wall-mounting display or shelf unit. Considerable time as well as some expertise
10 is normally required to assemble a unit from such a kit and so the kits are not as widely sold as they might otherwise be.

There is a demand for relatively small display cabinets or shelf units, possibly having transparent front sliding doors, for the display of collectable items, such as model vehicles, thimbles, small items of pottery and so on. Many
15 of the self-assembly shelf units mentioned above are unsuitable for this purpose, since they tend to be made of relatively thick materials; the shelf units when assembled tend to be relatively large and so heavy.

It is a principal aim of the present invention to provide a display or shelf unit kit which may rapidly and easily be assembled into a complete display or
20 shelf unit, and which kit may be originally manufactured so as to be of relatively light construction, so rendering the completed unit suitable for the display of delicate items.

According to the present invention, there is provided a display or shelf unit kit comprising:- a rectangular back-board, a top panel hinged to one edge of the back-board, a pair of side panels hinged respectively to the two edges of the back-board adjacent said one edge, and a bottom panel hinged to the edge of the back-board opposed to said one edge; and

- locking means adapted to secure together adjacent abutting edges of the top panel, pair of side panels and bottom panel when each of the top panel, pair of side panels and bottom panel have been hinged to lie at right angles to the plane of the back-board.

10 It will be appreciated that with the unit kit of this invention, a complete display or shelf unit may rapidly be assembled, merely by hinging the top panel, pair of side panels and bottom panel so as all to lie at right angles to the plane of the back-board, then utilising the locking means to secure together the adjacent abutting edges of the panels. All of the back-board and panels may be pre-cut to precise dimensions to ensure exact fitting for a strong shelf unit with the various parts securely joined exactly at right angles. However, for packaging purposes, each of said panels may be hinged to a respective first position, where each panel lies in substantially the same plane as the back-board. From there, each panel may be hinged to a respective second position, where the panel lies in a plane substantially at right angles to the plane of the back-board, ready for connection to the next adjacent panel, using the locking means.

The utility of the unit of this invention is greatly enhanced by providing an internal shelf hinged to the back-board along a line parallel to the edges of the

back-board to which the top and bottom panels are hinged, part way between said edges. The length of such a shelf is preferably greater than the distance between the inside faces of the side panels when hinged to lie at right angles to the plane of the back-board; in this case, the two side panels may have
5 respective grooves therein to receive the ends of the shelf. For greater security, locking means may be provided to connect each end of the shelf to the respective side panel, though it may be sufficient to rely upon the grooves in the side panels, to hold the shelf.

Most preferably, two or more such shelves are provided, each hinged to
10 the back-board in the same manner to that of the first-mentioned shelf, the side panels having corresponding grooves formed therein, to receive the ends of the shelves.

In order to facilitate the connection of the end of one panel to the end of the next adjacent panel, one of the adjoining panels at each junction may have a
15 hinged tab which may be folded round to lie at right angles to the general plane of that panel, and so against a face of the adjacent panel. The locking means may then act between said tab and the adjacent panel. The appearance of the shelf unit may be enhanced by ensuring each tab folds round to lie against the inwardly-directed face of the adjacent panel.

20 Various kinds of locking means may be employed, including snap-connecting fasteners for example of moulded plastics material and having one component on one panel end and the other component on the other panel end. Alternatively, where demounting of the shelf unit may be required, the locking

means may comprise a plurality of screw-threaded fasteners which may simply be tightened using a screw-driver, or subsequently released using the same tool. Other possibilities, particularly where one panel at each junction has a hinged tab to lie against a face of the adjacent panel, include headed press-fitting pins or spread-rivets.

Most advantageously, a unit kit of this invention as described above has the back-board and the top, side and bottom panels all formed integrally as a one-piece plastics material moulding, the hinges between the various components being defined by lines of weakening. Alternatively, the back-board and the top, side and bottom panels may be formed separately, with elongate hinges being provided between the edges of the back-board and each of the panels. In this case, plastic-film hinges or metallic piano hinges may serve to interconnect the panels to the edges of the back-board.

The inwardly directed faces of the panels may be provided with grooves along the edges thereof remote from the back plane, so that doors may be slidably mounted in the grooves. Such doors may comprise transparent glass or acrylic sheets of a suitable shape and size. Preferably, two such grooves are arranged closely adjacent one another, so that one door may slide to over-lie the other and so permit easy access to the interior of the shelf unit.

This invention extends to a display or shelf unit whenever assembled from a kit of this invention.

By way of example only, one specific embodiment of shelf unit kit constructed and arranged in accordance with the present invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a view of the kit, opened out for packing and transport;

5 **Figure 2** is a perspective view of the kit of **Figure 1**, when assembled into a complete shelf unit;

Figure 3 is a different embodiment of the kit, showing channels in the backboard to which the shelves may be coupled; and

Figure 4 shows an expanded view of the channel and insert by means of
10 which the shelf is coupled to the back-board.

The shelf unit kit illustrated in the drawings comprises a one piece plastics moulding having a rectangular back-board 10 defining a top edge 11 a pair of opposed side edges 12 and 13 and a bottom edge 14. Hinged to the edges 11 to 14 respectively by lines of reduced thickness plastic, are
15 respectively a top panel 15, and pair of side panels 16 and 17 and a bottom panel 18. The hinge lines between the respective panels and the back-board 10 permit each panel to be folded round from the illustrated position in **Figure 1**, where the panels are substantially co-planer with the back-board 10, to positions where each panel lies substantially at right angles to the plane of the back-
20 board 10, as illustrated by arrows A in **Figure 1**.

The ends of the top panel 15 and bottom panel 18 are provided with respective tabs 20, also hinged to the panels by lines of reduced thickness plastics material, such that the tabs 20 may be folded round to lie substantially

at right angles to the planes of the top and bottom panels, as illustrated by arrows B. Each tab 20 has a pair of holes 21 formed therein, which holes 21 come into registration with further holes 22 formed in the end regions of each of the side panels 16 and 17, when those panels are also folded round to lie at right angles to the back-board 10. Then, suitable fasteners may be passed through the registering holes, so as to hold all four panels together, mutually at right angles.

The shelf unit also includes five shelves 25, each moulded integrally with the back-board 10 and connected thereto by means of a respective hinge 26, defined by a line of reduced thickness plastic material. Each shelf may hinge down to lie on top of the face of the base board 10, the spacing between the shelves being no smaller than the height of up-stand of each shelf, from the base board 10, so as to permit folding down in this way. The length of each shelf 25 is slightly greater than the distance between the inside faces of the side panel 16 and 17, when folded round in the direction of arrows B. To accommodate the end portions of the shelves, each side panel 16 and 17 has a series of grooves 27 in alignment with the hinges 26, as best appreciated in Figure 1.

To assemble the shelf unit, all of the shelves 25 must be hinged from their initial positions where they overlie the back-board 10, to a position where each shelf lies substantially at right angles to the base board 10. Then, each side panel 16 and 17 is also hinged to lie at right angles to the back-board 10 and to receive in its respective grooves 27 the end portions of the shelves 25. Finally,

after folding the tabs 20 and then the top and bottom panels 15 and 18 so that the tabs 20 lie against the inwardly directed faces of the side panel 16 and 17, fasteners are passed through the registering holes so as to secure the shelf unit in the assembled position, shown in Figure 2.

5 Simple screw-threaded fasteners may be employed, such as self-tapping screws. In the alternative, headed pins may be utilised, which pins may include barbs so as to resist withdrawal. Another possibility would be to use so-called spread-rivets, including a bore in which a pin is located, movement of the pin with respect of the rivets servicing to expand the rivet and thus resist withdrawal.

10 It will be appreciated that a shelf unit as described above is very simple and rapid to assemble into a complete and useable shelf unit. On the other hand, the shelf unit may be folded down flat, for easy packaging, storage and transport.

Figure 3 shows one piece moulded construction comprising a back-board
15 30 defining a top edge 31 a pair of opposed side edges 32 and 33 and a bottom edge 34. Hinged to the edges 31 to 34 respectively by lines of reduced thickness plastic, are respectively a top panel 35, and pair of side panels 36 and 37 and a bottom panel 38. The hinge lines between the respective panels and the back-board 30 permit each panel to be folded round, in a similar fashion to
20 the embodiment of Figure 1, from the illustrated positions to positions where each panel lies substantially at right angles to the plane of the back-board 30.

Holes 39 are formed in the back-board and these permit the entire shelf unit to be attached to a separate structure such as wall. In this way the unit may be mounted on a wall for display or simply fixed for greater stability.

Channels 40 are formed in the back-board 30 to permit the connection of separately formed shelves (not shown) thereto. The shelves are provided with a complementary insert which engages in the channel 40 and fixes the shelf to the back-board but still permits hinging between a position lying parallel to the back board and a position perpendicular thereto.

When a shelf (or shelves) is connected to the backboard, the kit will still lie flat, but may be erected into a shelf unit by the following method. The shelves, top panel 35 and bottom panel 38 are hinged to lie perpendicular to the plane of the back-board 30. Side panels 36 and 37 are also swung to a position perpendicular to back-board 30. The inner faces of side panels 36 and 36 have recesses 41 formed thereon and as the side panels are swung to the perpendicular position, the ends of the top panel 35 and the bottom panel 38 engage in the recesses 41. Releasable retention means such as catches may be provided to hold the panels in the constructed position for as long as is desired. Such retention means could take the form of complementary engaging parts located on the ends of the top and bottom panels 35 and 38, and in the recesses 41. When the shelf unit is erected, the ends of any shelves attached to the back-board may rest upon suitable projections 42 formed on the inner surfaces of the side panels 36 and 37.

The inner surface of the top and bottom panels 35 and 38 are provided with channels 50. These are formed adjacent the front edges 51, and when the top and bottom panels are swung their positions perpendicular to the back-board, the channels on the top and bottom panels are suitably aligned to receive at least one sliding panel (not shown) therein. This sliding panel or panels could act as a door for the open side of the shelf unit.

Figure 4 shows an expanded view of a mechanism for connecting a shelf to the back-board 30. A channel 40 is formed in the backboard. An insert 44 is connected to the rear edge 42 of a shelf 43. The insert 44 is complementary to channel 40 and is matingly engageable therein. The insert 44 may be formed integrally with the shelf 43 in a one piece moulding, in which case the hinge 45 may be created by a line of weakening or thinning of the material, however the insert could be separately formed and subsequently connected to the shelf using a separate hinge such as is described above.

15 In order to prevent the insert, and consequently the associated shelf, from becoming dissociated from the back-board, releasable retention means may be provided on the insert and channel. In Figure 4 the insert 44 is provided with a resiliently deformable tab 46 which, when correctly aligned, engages with a complementary cut-out 47 in the channel 40. When located in the cut-out 47, 20 the tab 46 prevents removal of the insert 44 from the channel 40. Preferably a number of such retention means are arranged along the channel. If the tab(s) 46 is depressed to below the abutting face 48, the insert 44 may then be withdrawn from the channel 40.

The shelf 43 and insert 44 may be formed in such a way that when connected to the back-board approximately 180° of rotation about the hinge is possible. However, as shown in Figure 4, an arrangement where only 90° of rotation is possible may be preferable. When connected to the back-board 30 a part 49 of the shelf 43 extends below the hinge 45, so that in use the hinging of the shelf to a position below one perpendicular to the back-board is prevented by abutment of part 49 against the insert and/or the surface of the back-board. This still permits the shelf to be hinged to a position lying parallel to and against the back-board in the area above the channel 40.

CLAIMS

1. A shelf unit kit comprising:
 - a rectangular back-board, a top panel hinged to one edge of the back-board, a pair of side panels hinged respectively to the two edges of the back-board adjacent said one edge, and a bottom panel hinged to the edge of the back-board opposed to said one edge; and
 - locking means adapted to secure together adjacent abutting edges of the top panel, pair of side panels and bottom panel when each of the top panel, pair of side panels and bottom panel have been hinged to lie at right angles to the plane of the back-board.
2. A shelf unit kit as claimed in claim 1, wherein each of said panels may be hinged between a respective first position where the panels lie in substantially the same plane as the back-board and a second position where each panel lies in a respective plane substantially at right angles to the plane of the back-board.
3. A shelf unit kit as claimed in claim 1 or claim 2, wherein there is a shelf hinged to the back-board along a line parallel to edges of the back-board to which the top and bottom panels are hinged, part-way between said edges.
4. A shelf unit kit as claimed in claim 3, wherein the length of the shelf is greater than the distance between the inside faces of the side panels when hinged to lie at right angles to the plane of the back-board, and the two side panels have respective grooves therein to receive the ends of the shelf.

5. A shelf unit kit as claimed in claim 3 or claim 4, wherein there is a plurality of parallel shelves hinged to the back-board in a corresponding manner to that of the first-mentioned shelf.
6. A shelf unit kit as claimed in any of the preceding claims, wherein one panel at each junction between adjacent panel ends has a hinged tab which may be folded round to lie at right angles to the general plane of the panel and so against a face of the adjacent panel, the locking means acting between the said tab and the adjacent panel.
7. A shelf unit kit as claimed in claim 6, wherein each tab folds round to lie against the inwardly-directed face of the adjacent panel.
8. A shelf unit kit as claimed in any of the preceding claims, wherein the locking means comprises a plurality of screw-threaded fasteners or a plurality of headed press-fitting pins or rivets.
9. A shelf unit kit as claimed in any of the preceding claims, wherein the back-board and the top, side and bottom panels are all formed integrally as a one-piece plastics material moulding.
10. A shelf unit kit as claimed in any of claims 1 to 9, wherein the back-board and the top, side and bottom panels are all formed separately, elongate plastic-film hinges being provided between the back-board and each of the panels.
11. A shelf unit kit as claimed in any of the preceding claims, wherein the inwardly directed faces of the panels are provided with grooves along the edges thereof remote from the back-plane and in which grooves doors are slidably mounted.

12. A shelf unit kit as claimed in any of claims 3 to 11, wherein the shelves are separately formed and may be selectively coupled and de-coupled from the back board.

13. A shelf unit kit as claimed in claims 12, wherein each shelf is provided
5 with an insert hingedly connected thereto, which insert is designed matingly to engage with a complementary channel formed on the back-board thereby to connect the shelf to the back-board, and permit hinging of the shelf with respect to the backboard.

14. A shelf unit kit as claimed in claim 1 and substantially as hereinbefore
10 described with reference to and as illustrated in the accompanying drawings.



Application No: GB 9918888.0
Claims searched: ALL

Examiner: R E Hardy
Date of search: 26 November 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.Q): A4B
Int CI (Ed.6): A47B 43/00 43/02; A47F 5/10 5/11
Other: Online : EPODOC, WPI, JAPIO

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Documents considered to be relevant:

Category	Identity of document and relevant passage			Relevant to claims
X, Y	GB1370660	A	MULTI-COMMERCE : See the Figures and note p.2 lines 1-2	X:1-3,5 Y:3,5
X, Y	GB1361501	A	STC : See the Figures	X:1,2,9 Y:8
X, Y	GB1325126	A	POSCHINGER : See the Figures	X:1,2,10 Y:2,5
X	GB0635949	A	SMALMAN-SMITH : See the Figures and note p.1 lines 80-88	1,2
Y	US5465851	A	SMITH : See especially Figure 2	3,5,9
X, Y	US5316156	A	LAND : See especially Figure 1	X:1,2,6,7, Y:9
X, Y	US5190211	A	STODDARD : See especially Figure 1	X:1-3,6,7 Y:5,9
X, Y	US5143431	A	UDELL : See the Figures	X:1,2,6,7 Y:9
Y	US4582003	A	VALERO : See the 3,5 Figures	3,5,9

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